

REMARKS

Request for an Examiner's Interview

The Applicants' Attorney hereby requests an interview with the Examiner in order to expedite the prosecution of this case.

Pending Claims:

Claims 1-12, 16-23, 27-32, and 34-35 are currently pending in the present application. Claims 1, 20, 29, and 35 have been amended. Claims 14 and 25 have been canceled.

Rejections under 35 U.S.C. §103(a)

Claims 1-11, 14, 16-22, 25, 27-31, 34 and 35 are rejected under U.S.C. §103(a) as being unpatentable over U.S. Patent Number 6,985,020 to Zhou et al. (hereinafter "Zhou Patent") in view of U.S. Patent 6,204,718 to Pidgeon (hereinafter "Pidgeon") or U.S. Patent Publication No. 2004/0052536 to Zhou et al. (hereinafter "Zhou Application"). Claims 12, 23, and 32 are rejected under U.S.C. §103(a) as being unpatentable over Zhou, in view of Pidgeon and the Zhou Application and further in view of U.S. Patent No. 6,917,764 to Wilson.

Independent Claim 1

Independent claim 1 has been amended to include the limitation of claim 14, which has been canceled by the present amendment. In particular, independent claim 1 has been amended to recite a pre-distortion circuit fabricated on a monolithic substrate and a laser fabricated on the monolithic substrate in close proximity to the pre-distortion circuit. The amendment to claim 1 is supported by the present specification. See, for example, paragraphs 46-47, which states that the pre-distortion circuit, CW laser, and EA modulator can be fabricated monolithically.

One feature of fabricating the pre-distortion circuit on the same monolithic substrate as the laser is that the pre-distortion circuit can easily generate pre-distortion signals that cancel any temperature dependent non-linearities. Another feature of fabricating the pre-distortion circuit on the same monolithic substrate as the laser is that the monolithic integration reduces the need for an equalization circuit because time delays will be greatly reduced in a monolithic integrated circuit compared with discrete devices and, therefore, the phase disparity of different frequency components will be significantly reduced near the frequency of interest.

In contrast, the Zhou Patent includes interface components that provide an impedance match between the pre-distortion circuit and the laser. Referring to Zhou FIG. 7 and to the text beginning on Zhou column 6, Zhou describes that inductor L301, capacitor C304, and match resistor R309 are used for impedance matching. The Applicants submit that such impedance matching components are not necessary in the integrated laser device claimed in independent claim 1 because independent claim 1 recites that the modulation input of the laser has an input impedance that is substantially matched to the output impedance of the non-linear circuit. Such an impedance match is easy to achieve when both devices are fabricated on the same monolithic substrate. Similarly, the Zhou Application describes using a balun 12 that provides impedance matching for the unbalanced laser. See, for example, Zhou Application paragraphs 5 and 21. Also, Pidgeon described using components to minimize impedance mismatch between the predistortion circuit and the laser. See for example, column 9, lines 29-40.

The Office Action states that the Zhou Patent and Pidgeon or the Zhou Application teaches that the integral laser and the pre-distortion circuit are fabricated on a single monolithic substrate. The Office Action refers to Pidgeon FIGS. 2a, b, 3, and 4a and also to the text on col. 4, lines 28-67, col. 5, lines 1-8, col. 6, lines 61-67 and col. 7, lines 1-67. The Applicants have

reviewed these figures and text and could not find any description that the laser and pre-distortion circuit are fabricated on a single monolithic substrate. In fact, the Applicants believe that the dashed lines surrounding the pre-distortion circuit 250 and the laser 205 indicate that these devices are not on the same substrate. If the present rejection is maintained, the Applicants request that the Examiner specifically state where in Pidgeon there is a description that the laser and pre-distortion circuit are fabricated on a single monolithic substrate as claimed in independent claim 1 as currently amended.

Furthermore, the Applicants have reviewed the Zhou Application and could not find any description that the laser and pre-distortion circuit are fabricated on a single monolithic substrate. Similar to Pidgeon, the Zhou Application shows components in dashed lines that indicate to the Applicants that the pre-distortion circuit and the laser are not on the same substrate. In addition, the Zhou Application describes an apparatus including a balun that provides impedance matching for the unbalanced laser. See, for example, Zhou Application paragraphs 5 and 21. If the present rejection is maintained, the Applicants request that the Examiner specifically state where in the Zhou Application there is a description that the laser and pre-distortion circuit are fabricated on a single monolithic substrate.

Therefore, the Applicants submit that independent claim 1 is allowable over Zhou, Pidgeon, and the Zhou Application because these references do not teach or describe an integrated laser device comprising a laser and pre-distortion circuit fabricated on a single monolithic substrate where the input impedance of the electrical modulation input of the laser is substantially matched to an output impedance of the pre-distortion circuit as claimed in claim 1 as currently amended. In addition, the Applicants submit that dependent claims 2-12 and 16-19 are allowable as depending on an allowable base claim.

Independent Claim 20

Independent claim 20 has been amended to include the limitation of claim 25. More specifically, claim 20 has been amended to recite an optical source including a pre-distortion circuit fabricated on a monolithic substrate and a laser fabricated on the monolithic substrate in close proximity to the pre-distortion circuit. In light of the above arguments made in connection with independent claim 1, the Applicants submit that independent claim 20 is allowable over Zhou, Pidgeon, and the Zhou Application because these references do not teach or describe an integrated laser device comprising a laser and pre-distortion circuit that are fabricated on a single monolithic substrate.

Independent Claim 29

Independent claim 29 has been amended to recite a method of generating a modulated optical signal with reduced second-order and third-order distortions that includes the step of propagating a pre-distorted modulation signal through a transmission line to a modulation input of a laser monolithically fabricated with the non-linear electronic circuit. In light of the above arguments made in connection with independent claim 1, the Applicants submit that independent claim 29 is allowable over Zhou, Pidgeon, and the Zhou Application because these references do not teach or describe an integrated laser device comprising a laser and pre-distortion circuit that are fabricated on a single monolithic substrate.

Independent Claim 35

Independent claim 35 has been amended to recite a means for propagating the pre-distorted modulation signal through a transmission line to a modulation input of a laser

monolithically fabricated with the non-linear electronic circuit. In light of the above arguments made in connection with independent claim 1, the Applicants submit that independent claim 35 is allowable over Zhou, Pidgeon, and the Zhou Application because these references do not teach or describe an integrated laser device comprising a laser and pre-distortion circuit are fabricated on a single monolithic substrate.

CONCLUSION

Claims 1-12, 16-23, 27-32, and 34-35 are currently pending in the present application. Claims 1, 20, 29, and 35 have been amended. Claims 14 and 25 have been canceled. The Applicants respectfully request reconsideration of the pending claims in light of the amendments and arguments presented in this Amendment and Response. The Applicants' Attorney has requested an interview with the Examiner in order to expedite the prosecution of this case. The Applicants' Attorney welcomes the opportunity to discuss any outstanding issues, and to work with the Examiner toward placing the application in condition for allowance.

Respectfully submitted,

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Tel. No.: (781) 271-1503
Fax No.: (781) 271-1527
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/Kurt Rauschenbach/
Kurt Rauschenbach, Ph.D.
Reg. No. 40,137
Attorney for Applicant
Rauschenbach Patent Law Group, LLC
Post Office Box 387
Bedford, MA 01730